

**COLORADO RIVER RECOVERY PROGRAM
FY-99 ANNUAL PROJECT REPORT**

**RECOVERY PROGRAM
PROJECT # 85**

I. Project Title: Channel Monitoring to Evaluate Geomorphic Changes on the Mainstem Colorado River

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III. Project Summary:

The project is designed to develop a better understanding of sediment transport and channel dynamics in the upper Colorado River to evaluate rates of channel change and geomorphic effects of coordinated reservoir releases and normal snowmelt flows. The study will identify the window of time of peak sediment delivery to the 15-Mile Reach. The study will also compare and contrast effects of augmenting flows on the ascending and descending limbs of the annual hydrograph. Detailed surveys of channel topography were conducted along a 1-km section of the 15-Mile Reach. Sediment traps, consisting of large tin cans filled with clean gravel, were placed at three sites in the 15-Mile Reach and at two sites in the 18-Mile Reach. Cross sections at the mouths of secondary channels and backwaters, that were first surveyed 5 years ago, were re-located and re-surveyed. The study will culminate in the development of a matrix, which can be used by the Coordinated Reservoir Operations group to tailor reservoir operation to target multiple objectives of habitat maintenance and creation.

IV. Study Schedule: Initial Year - 1998, Final Year - 2002

V. Relationship to RIPRAP: **Colorado River Action Plan: Mainstem I.A.c.(3)(c)** Coordinated Reservoirs Operations.

VI. Accomplishments: 1999 was the second year of this project. Field work again focused on effects of spring and summer flows on geomorphic processes in the 15- and 18-Mile Reaches of the Colorado River. Three separate tasks were undertaken during the 1999 field season:

A. Cross sections within a 1-km segment of the 15-Mile Reach near River Mile (RM) 176 were re-surveyed. This segment of river is being used for channel monitoring because it has a variety of active geomorphic features, and because it includes property on the south bank that was purchased by the U. S. Fish and Wildlife Service and the Bureau of Reclamation. Water-surface elevations were surveyed here in early July, after the peak discharge, and eight of the cross sections were re-surveyed in early fall with the river at base flow.

B. Sediment traps consisting of large tin cans filled with clean gravel were periodically cleaned and replaced. These traps are being used to monitor the movement and infiltration of fine sediment (sand and silt) after the peak discharge. The traps were cleaned at intervals ranging from about two weeks to a few days. Sediment size analysis was subsequently done at the Bureau of Reclamation lab in Denver.

C. Cross sections at the mouths of selected secondary channels and backwaters were re-surveyed. These sections will continue to be used to monitor scour and fill in these off-channel habitats.

Discussion of Initial Findings:

A. Provisional streamflow data for the USGS gauge near Cameo indicate that the Colorado River reached a peak mean daily discharge of 15,100 cfs (428 cms) on 6/10/99; that peak was followed by a second, smaller one of 13,600 cfs (385 cms) on 6/26/99. Coordinated reservoir operations contributed as much as 176 cms, and other areas indicated that these flows were high enough to move the gravel bed material, as predicted by previous hydraulic modeling results. Evidence for active gravel transport included local scour and fill at selected cross sections, fresh gravel deposits on bar surfaces, fresh gravels resting on

top of the sediment traps, and missing sediment traps, i.e. a few of the sediment traps could not be found, presumably because they were scoured away.

B. The sediment traps were cleaned several times on the receding limb of the hydrograph (from early July through mid-August). Sampling over shorter and shorter time intervals revealed that fine sediment can fill the void spaces in the traps in as little as 2 days, although this depends on the specific location of the trap. There also appears to be a transition in the size of sediment collected, from medium-coarse sand, in the week or two following the peak, to fine sand and silt, later in the summer. The transition in sediment size presumably represents a change in transport mode from sand moving as bed load to silt moving as suspended load.

C. Surveys of the backwater cross sections indicate continued fill at one site and little change at the other sites. Continued monitoring of these cross sections should prove useful, as these sites have the potential to store significant amounts of fine sediment, and can serve as indicators of the movement and storage of fine sediment through the system.

VII. Recommendations: The findings of this work should be shared with the Coordinated Reservoirs team as soon as any definitive results are identified and documented. Currently the Principal Investigator meets with the CROP team twice a year to share results.

VIII. Project Status: Ongoing and on-track.

IX. FY-99 Budget:

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| Funds provided: | \$ 16,400 |
| Funds expended: | <u>\$ 16,400</u> |
| Difference: | 0 |

X. Status of Data Submission: Cross section and sediment data will be made available to the Recovery Program Library in June 2000.

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| XI. Signed: | <u>George Smith, for John Pitlick</u> | <u>December 30, 1999.</u> |
| | Principal Investigator | Date |

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